WHAT IS CLAIMED IS:

1. A sorbent cartridge comprising at least sodium zirconium carbonate.

2. The sorbent cartridge of claim 1, wherein said sodium zirconium carbonate is present as a layer in said sorbent cartridge.

3. The sorbent cartridge of claim 1, further comprising zirconium phosphate.

4. The sorbent cartridge of claim 3, wherein said zirconium phosphate is present as a layer in said sorbent cartridge.

5. The sorbent cartridge of claim 3, wherein said zirconium phosphate comprises a H^+ content of from about 1.4 to about 2.0 wt%;

a Na^+ content of from about 4 to about 6 wt%;

a ZrO_2 wt% of from about 34 wt% to about 37 wt%;

a PO_4 wt% of from about 41 wt% to about 43 wt%; and

a H_2O wt% of from about 14 wt% to about 18 wt%, based on the weight of the zirconium phosphate.

6. The sorbent cartridge of claim 3, wherein said zirconium phosphate has at least one of the following characteristics:

a) an adsorption capacity for ammonia of from about 20 mg NH_4-N/gm ZrP to about 45 mg NH_4-N/gm ZrP;

an adsorption capacity for Ca^{2+} of from about 2 mEq Ca^{2+}/gm ZrP to about 7 mEq Ca^{2+}/gm ZrP;

an adsorption capacity for Mg^{2+} of from about 1 mEq Mg^{2+}/gm ZrP to about 5 mEq Mg^{2+}/gm ZrP; and

an adsorption capacity for toxic heavy metals of from about 3 mEq HM/gm ZrP to about 9 mEq HM/gm ZrP;

b) a Na^+ content of from about 1.8 mEq Na^+/gm ZrP to about 3 mEq Na^+/gm ZrP at a pH of from about 5.5 to about 6;

c) a minimum leachable PO_4^{3-} of less than about 0.05 mg PO_4^{3-}/gm ZrP; or

d) satisfying ANSI/AAMI RD-5-1992 standard on extractable toxic impurities.

7. The sorbent cartridge of claim 5, wherein said zirconium phosphate has no residual sulfate or chloride.

8. The sorbent cartridge of claim 5, wherein said zirconium phosphate has less than 0.01% sulfate, chloride, or both.

9. The sorbent cartridge of claim 3, wherein said zirconium phosphate in H_2O has a pH of from about 6 to about 7.

10. The sorbent cartridge of claim 3, wherein said zirconium phosphate has an average grain size of from about 30 to about 40 microns.

11. A sorbent cartridge comprising an alkali metal-Group IV B metal carbonate.

12. The sorbent cartridge of claim 11, wherein said alkali metal-Group IV B metal carbonate is present as a layer in said sorbent cartridge.

13. The sorbent cartridge of claim 11, further comprising a Group IV B metal phosphate.

14. The sorbent cartridge of claim 1, further comprising alumina, alumina supported urease, granular activated carbon, or combinations thereof.

15. The sorbent cartridge of claim 14, wherein said alumina, alumina supported urease, and granular activated carbon are each present as separate layers in said sorbent cartridge.

16. The sorbent cartridge of claim 15, wherein said layers have the following order:

a) sodium zirconium carbonate;

b) zirconium phosphate;

c) alumina;

d) alumina supported urease;

e) granular activated carbon.

17. The sorbent cartridge of claim 16, wherein said sorbent cartridge further comprises a first filter pad located above and in contact with said sodium zirconium carbonate, a second filter pad is located between and in contact with said alumina supported urease and said granular activated carbon, and a third filter pad is located beneath and in contact with said granular activated carbon.

18. The sorbent cartridge of claim 17, further comprising a flow diffuser located beneath and in contact with said third filter pad.

19. The sorbent cartridge of claim 1, wherein said sodium zirconium carbonate comprises from about 2 wt% to about 5 wt% Na^+;

from about 44 wt% to about 50 wt% ZrO_2;

from about 12 wt% to about 18 wt% CO_3^{2-}; and

from about 30 wt% to about 40 wt% LOD, based on the weight of the sodium zirconium carbonate.

20. The sodium zirconium carbonate of claim 1, wherein said sodium zirconium carbonate satisfies ANSI/AAMI RD-5-1992 standard on extractable toxic impurities.

21. The sodium zirconium carbonate of claim 1, wherein said sodium

zirconium carbonate satisfies at least one of the following characteristics:

a phosphate adsorption having a minimum capacity of from about 30 to about 35 mg/PO_4-P/gm SZC;

a minimum HCO_3^- content of from about 2 to about 4 mEq HCO_3^- per gm SZC;

a leachable Na^+ content of from about 1.5 to about 2.0 mEq Na^+/gm SZC;

or a pH range of titrated sodium zirconium carbonate of from about 6 to about 7.

22. The sorbent cartridge of claim 1, further comprising hydrous zirconium oxide.

23. The sorbent cartridge of claim 22, wherein said hydrous zirconium oxide is in the acetate form.

24. The sorbent cartridge of claim 23, wherein said sodium zirconium carbonate and said hydrous zirconium oxide are present in a weight ratio of about 1 to 1.

25. The sorbent cartridge of claim 23, wherein said sodium zirconium carbonate and said hydrous zirconium oxide are present in a same layer and are blended together.

26. The sorbent cartridge of claim 1, further comprising zirconium basic carbonate.

27. The sorbent cartridge of claim 26, wherein said zirconium basic carbonate comprises Na^+ of less than about 1000 ppm;

a ZrO_2 wt% of from about 35 wt% to about 40 wt%;

and a CO_3^{2-} of from about 8 wt% to about 10 wt%, based on the weight of the zirconium basic carbonate.

28. The sorbent cartridge of claim 27, wherein said zirconium basic carbonate has about 0 wt% SO_4^{2-} and about 0 wt% Cl^-.

29. The sorbent cartridge of claim 1, wherein said sodium zirconium carbonate is present in said cartridge in an amount of from about 100 grams to about 300 grams.

30. The sorbent cartridge of claim 29, wherein said cartridge further comprises zirconium phosphate in an amount of from about 300 grams to about 1900 grams.

31. The sorbent cartridge of claim 30, further comprising alumina in the amount of from about 100 grams to about 500 grams, immobilized enzyme in an amount of from about 100 grams to about 300 grams, and activated carbon or other adsorbent in an amount of from about 100 grams to about 500 grams.

32. The sorbent cartridge of claim 1, further comprising an immobilized enzyme material capable of enzymatic conversion of urea to ammonium carbonate, a cation exchange material in the sodium or hydrogen form, an anion exchange material in the Ac^-, HCO_3^-, Cl^-, or OH^- form, and an adsorbent capable of removing creatinine, uric acid, or both.

33. The sorbent cartridge of claim 32, further comprising a chlorine removal material.

34. The sorbent cartridge of claim 32, wherein the materials are present as two or more layers in said cartridge.

35. The sorbent cartridge of claim 33, wherein the materials are present as two or more layers in said cartridge.

36. The sorbent cartridge of claim 11, further comprising an immobilized enzyme material capable of enzymatic conversion of urea to ammonium carbonate, a cation exchange material in the sodium or hydrogen form, an anion exchange material in

the Ac^-, HCO_3^-, Cl^-, or OH^- form, and an adsorbent capable of removing creatinine, uric acid, or both.

37. The sorbent cartridge of claim 11, further comprising a chlorine removal material.

38. The sorbent cartridge of claim 11, wherein the materials are present as two or more layers in said cartridge.

39. The sorbent cartridge of claim 11, wherein the materials are present as two or more layers in said cartridge.

40. A method to regenerate or purify spent dialysis fluid comprising passing said spent dialysis fluid through the sorbent cartridge of claim 1.

41. A method to regenerate or purify spent dialysis fluid comprising passing said spent dialysis fluid through the sorbent cartridge of claim 2.

42. A method to regenerate or purify spent dialysis fluid comprising passing said spent dialysis fluid through the sorbent cartridge of claim 3.

43. A method to regenerate or purify spent dialysis fluid comprising passing said spent dialysis fluid through the sorbent cartridge of claim 4.

44. A method to regenerate or purify spent dialysis fluid comprising passing said spent dialysis fluid through the sorbent cartridge of claim 5.

45. A method to regenerate or purify spent dialysis fluid comprising passing said spent dialysis fluid through the sorbent cartridge of claim 6.

46. A method to regenerate or purify spent dialysis fluid comprising passing said spent dialysis fluid through the sorbent cartridge of claim 11.

47. A method to regenerate or purify spent dialysis fluid comprising passing said spent dialysis fluid through the sorbent cartridge of claim 12.

48. A method to regenerate or purify spent dialysis fluid comprising passing said spent dialysis fluid through the sorbent cartridge of claim 13.

49. A method to regenerate or purify spent dialysis fluid comprising passing said spent dialysis fluid through the sorbent cartridge of claim 16.

50. An apparatus for conducting dialysis comprising the sorbent cartridge of claim 1, a dialyzer in fluid communication with said cartridge wherein spent dialysis fluid passes from said dialyzer to and through said cartridge.

51. The apparatus of claim 50, wherein said spent dialysis fluid is spent hemodialysis fluid.

52. The apparatus of claim 50, wherein spent dialysis fluid is restored to original balance of Na^+ and HCO_3^- contents found in fresh dialysate.

53. The apparatus of claim 50, wherein said dialyzer is in fluid communication with the blood of a patient.

54. The apparatus of claim 53, wherein the Na^+ and HCO_3^- balance in said blood is restored to levels found in healthy patient without renal problems.

55. The apparatus of claim 50, wherein said spent dialysis fluid is spent dialysate fluid obtained from a dialyzer wherein spent peritoneal dialysis fluid is passed through said dialyzer and cleaned by fresh dialysate fluid.

56. A dialysis system comprising the sorbent cartridge of claim 1 and a source of spent peritoneal dialysis solution, wherein the source of said spent peritoneal dialysis solution is in fluid communication with said cartridge wherein said spent peritoneal dialysis solution passes to and through said cartridge.

57. The sorbent cartridge of claim 1, wherein said cartridge is capable of restoring the balance of Na^+ and HCO_3^- in spent dialysate to levels found in fresh

dialysate.

58. The sorbent cartridge of claim 5, wherein said cartridge is capable of restoring the balance of Na^+ and HCO_3^- in spent dialysate to levels found in fresh dialysate.

59. The sorbent cartridge of claim 31, wherein said cartridge is capable of restoring the balance of Na^+ and HCO_3^- in spent dialysate to levels found in fresh dialysate.